

Use Attainability Analysis

for

WBID 0167 Brushy Creek

Submitted by
Pickett Ray and Silver

To
Missouri Department of Natural Resources
Water Protection Program

Date Received: June 5, 2007

Field Data Sheets for Recreational Use Stream Surveys**Data Sheet A - Water Body Identification****I. Water Body Information** (For water body being surveyed)

| | |
|---|-----------------|
| Water Body Name (from USGS 7.5' quad): Brushy Creek | |
| Missouri Waterbody Identification (WBID) Number: 0167 | |
| 8-digit HUC: 7110008 | County: 7110008 |
| Upstream Legal Description (from Table H): Sur 1708,51N,1W | |
| Downstream Legal Description(from Table H): Mouth | |
| Number of sites evaluated 3 | |
| List all sites numbers, listed consequently upstream to downstream: 1 - Confluence of 2 tributaries, 2, between Site 1 & 3, 3 - closest to N. Cornerstone Church Rd. | |

Site Locations Map(s): Attach a map of entire segment with assessment sites clearly labeled. Mark any other items that may be of interest. **Attached**

II. Subsegmentation (fill this section out only in cases where subsegmentation is being proposed)

| LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS) | | | |
|---|--------------------------------|---|--|
| Upstream Coordinates: UTM X Y | | Downstream Coordinates: UTM X Y | |
| HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.) | | | |
| Global Positioning System (GPS) | | Interpolation | |
| Static Mode | | Topographic Map or DRG | |
| Dynamic Mode (Kinematic) | | Aerial Photograph or DOQQ | |
| Precise Positioning Service | | Satellite Imagery | |
| Signal Averaging | | Interpolation Other | |
| Real Time Differential Processing | | | |
| HORIZONTAL ACCURACY ESTIMATE | | | |
| GPS Data Quality | | Interpolation Data Quality | |
| FOM | ± _____ Meters | Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters | |
| EPE | ± _____ Feet or ± _____ Meters | | |
| PDOP | | | |

III. Discharger Facility Information (list all permitted dischargers on the stream)

| |
|---|
| Discharger Facility Name(s): Eolia WWTF |
| Discharger Permit Number(s): MO 0112470 |

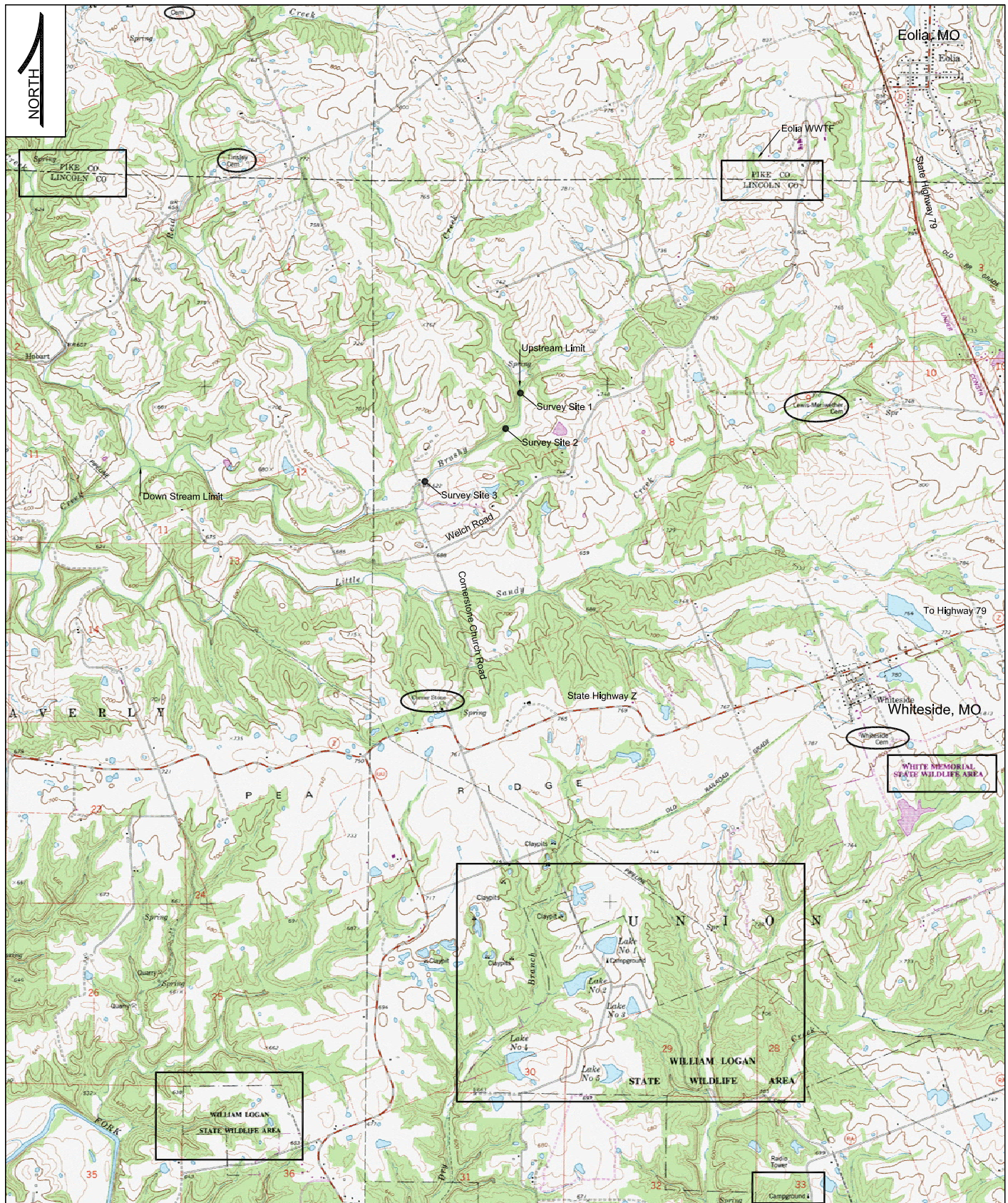
IV. UAA Surveyor (please print legibly)

| | |
|-------------------------------------|--------------------------------|
| Name of Surveyor: Renee Martin | Telephone Number: 573-875-7844 |
| Organization/Employer: AE Solutions | |
| Position: Environmental Specialist | |

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Renee Martin **Date:** 5/7/07

\\\\3serverprps\\Projects\\07031\\dwg\\Task 4 Brushy Creek 167.dwg, 5/29/2007 10:55:49 AM, 1:2000, MATT COSBY



PICKETT RAY & SILVER
Civil Engineers Land Surveyors Natural Resources

Address: 333 Mid Rivers Mall Drive
St. Peters, Missouri 63376
Phone: (636) 397-1211
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WBID #: 167
Name: Brushy Creek
County: Lincoln/Pike
USGS Location Map



NOT TO SCALE

PRS Job Number: 07031.MODN.00E
Drawn By: M.C. Date: 05-29-07
Checked By: J.V. Date: 05-29-07

WBID# 0167
Site# 1

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
(must be completed for each site)

| | |
|--|---|
| Date & Time: 1745 5/7/07 | Site Location Description (e.g., road crossing): |
| Personnel (Data Collectors): R. Martin & J. Hrabik | Closest to Morgan Rd. - Brushy Creek near confluence of 2 tributaries |
| Current Weather Conditions: clear | Facility Name: Eolia WWTF |
| Weather Conditions for Past 10 days: unknown | Permit Number: MO 0112470 |
| Drought Conditions?: No drought <input type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input checked="" type="checkbox"/> | |

Site Locations:

| LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS) | | | |
|---|-----------------------------------|--|--|
| Site GPS Coordinates: UTM X: 0668259 | | Y: 0668259 | |
| HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.) | | | |
| Global Positioning System (GPS) | | Interpolation | |
| Static Mode | X | Topographic Map or DRG | |
| Dynamic Mode (Kinematic) | | Aerial Photograph or DOQQ | |
| Precise Positioning Service | | Satellite Imagery | |
| Signal Averaging | | Interpolation Other | Real Time Differential Correction with |
| Real Time Differential Processing | | Post Processing | |
| HORIZONTAL ACCURACY ESTIMATE | | | |
| GPS Data Quality | | Interpolation Data Quality | |
| FOM | ± _____ Meters | Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters | |
| EPE | ± 51 _____ Feet or ± _____ Meters | | |
| PDOP | | | |

Photos:

| Upstream Photos | | Downstream Photos | | Other Photos | |
|---------------------|---------------|------------------------|--|--------------|---------------|
| Photo ID# | Photo Purpose | Photo ID# | Photo Purpose | Photo ID# | Photo Purpose |
| See Attached Photos | | 0167-1-19 0167-1-20 | Upstream Transect #1, Site #1 Downstream Transect #1, Site #1 | | |

Uses Observed*: (Uses actually observed at time of survey.)

| | | | | |
|--|--------------------------------------|---------------------------------------|---|---------------------------------------|
| <input type="checkbox"/> Swimming | <input type="checkbox"/> Skin diving | <input type="checkbox"/> SCUBA diving | <input type="checkbox"/> Tubing | <input type="checkbox"/> Water skiing |
| <input type="checkbox"/> Wind surfing | <input type="checkbox"/> Kayaking | <input type="checkbox"/> Boating | <input type="checkbox"/> Wading | <input type="checkbox"/> Rafting |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Trapping | <input type="checkbox"/> Fishing | <input checked="" type="checkbox"/> None of the above | <input type="checkbox"/> Other: |
| Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.) | | | | |

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

| | | | | |
|--|--------------------------------------|---|---|--|
| <input type="checkbox"/> City/county parks | <input type="checkbox"/> Playgrounds | <input type="checkbox"/> MDC conservation lands | <input type="checkbox"/> Urban areas | <input type="checkbox"/> Campgrounds |
| <input type="checkbox"/> Boating accesses | <input type="checkbox"/> State parks | <input type="checkbox"/> National forests | <input type="checkbox"/> Nature trails | <input type="checkbox"/> Stairs/walkway |
| <input type="checkbox"/> No trespass sign | <input type="checkbox"/> Fence | <input type="checkbox"/> Steep slopes | <input checked="" type="checkbox"/> None of the above | <input checked="" type="checkbox"/> Other: |
| Comments: Agriculture Fields | | | | |

Indications of Human Use*: (attach photos)

| | | | | | |
|--|--|--|---|---|--|
| <input type="checkbox"/> Roads | <input type="checkbox"/> Rope swings | <input type="checkbox"/> Foot paths/prints | <input type="checkbox"/> Dock/platform | <input type="checkbox"/> Livestock Watering | <input type="checkbox"/> RV / ATV Tracks |
| <input type="checkbox"/> Camping Sites | <input type="checkbox"/> Fire pit/ring | <input type="checkbox"/> NPDES Discharge | <input type="checkbox"/> Fishing Tackle | <input type="checkbox"/> Other: | |
| Comments: None | | | | | |

* Page Two – Data Sheet B for WBID # 0167:

Stream Morphology:

Upstream View's Physical Dimensions: Is there any water present at this view? ☒ Yes ☐ No

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | 60 | 7.0 | 30 | 0.2 | 0.3 |
| POOL | | | | | |

Downstream View's Physical Dimensions: Is there any water present at this view? ☐ Yes ☐ No

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | | | | | |
| POOL | | | | | |

Substrate*: (These values should add up to 100%.)

| | | | | | |
|------------|------------|----------|----------|--------------|---------------|
| - % Cobble | - % Gravel | - % Sand | - % Silt | - % Mud/Clay | 100 % Bedrock |
|------------|------------|----------|----------|--------------|---------------|

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

Algae all over substrate

Water Characteristics*: (Mark all that apply.)

| | | | | | |
|------------------|---|---------------------------------|--|--|---------------------------------|
| Odor: | <input type="checkbox"/> Sewage | <input type="checkbox"/> Musky | <input type="checkbox"/> Chemical | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |
| Color: | <input checked="" type="checkbox"/> Clear | <input type="checkbox"/> Green | <input type="checkbox"/> Gray | <input type="checkbox"/> Milky | <input type="checkbox"/> Other: |
| Bottom Deposit: | <input type="checkbox"/> Sludge | <input type="checkbox"/> Solids | <input checked="" type="checkbox"/> Fine sediments | <input type="checkbox"/> None | <input type="checkbox"/> Other: |
| Surface Deposit: | <input type="checkbox"/> Oil | <input type="checkbox"/> Scum | <input type="checkbox"/> Foam | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: Renee Martin Date of Survey: 5/7/07

Organization: AE Solutions Position: Env. Specialist

Recreational Use Attainability Analysis Field Survey Sheet

| | | | |
|--|--|---|--|
| Waterbody ID: <u>0167</u> | | Site #: <u>0167-1</u> | |
| Estimated Channel Incision: <u><1.0</u> (m) (height between low bank width and water) | | | |
| GPS Location: <u>668259</u> | | UTM Y: <u>4341438</u> | |
| UTM X: <u>668259</u> | | Horizontal Accuracy Estimate (GPS Data Quality): <u>+/- 51</u> (feet) | |
| Average Stream Width: <u>8</u> (meters) | | Length of Survey Segment: <u>160</u> (meters) (20x average stream width) | |
| Field Staff: <u>Renee Martin & Jenny Hrabik</u> | | | |

| Dissolved Oxygen | |
|--------------------|----------------------|
| Dissolved Oxygen: | <u>9.3</u> (mg/L) |
| Dissolved Oxygen: | <u>112.7</u> (% sat) |
| Specific Cond: | <u>372</u> (µS/cm) |
| Water Temperature: | <u>23.8</u> (°C) |

| Transect Cross-Section | | | | | | | | | | | | | | | | | | | | | |
|------------------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|
| 01 | | 02 | | 03 | | 04 | | 05 | | 06 | | 07 | | 08 | | 09 | | 10 | | 11 | |
| Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) |
| 0.0 | <0.1 | 1.4 | 0.1 | 0.0 | 0.1 | 0.6 | 0.1 | 0.1 | 0.1 | 2.3 | 0.1 | 1.9 | 0.1 | 1.5 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 1.4 | 0.1 |
| 0.95 | <0.1 | 2.0 | 0.1 | 0.7 | 0.2 | 1.2 | 0.1 | 0.7 | <0.1 | 2.4 | 0.1 | 2.4 | 0.1 | 1.8 | 0.1 | 0.8 | 0.1 | 0.9 | 0.2 | 2.3 | 0.1 |
| 1.9 | <0.1 | 2.6 | 0.1 | 1.4 | 0.2 | 1.8 | 0.2 | 1.3 | 0.0 | 2.5 | 0.1 | 2.9 | 0.1 | 2.1 | 0.15 | 1.6 | 0.2 | 1.6 | 0.2 | 3.2 | 0.0 |
| 2.85 | <0.1 | 3.2 | 0.1 | 2.1 | 0.2 | 2.4 | 0.1 | 1.9 | 0.0 | 2.6 | 0.1 | 3.4 | 0.1 | 2.4 | 0.2 | 2.4 | 0.2 | 2.3 | 0.3 | 4.1 | 0.0 |
| 3.8 | <0.1 | 3.8 | 0.1 | 2.8 | 0.1 | 3.0 | 0.1 | 2.5 | <0.1 | 2.7 | 0.1 | 3.9 | 0.2 | 2.7 | 0.2 | 3.2 | 0.2 | 3.0 | 0.3 | 5.0 | 0.0 |
| 4.75 | <0.1 | 4.4 | 0.1 | 3.5 | <0.1 | 3.6 | 0.1 | 3.1 | <0.1 | 2.8 | 0.1 | 4.4 | 0.2 | 3.0 | 0.1 | 4.0 | 0.2 | 3.7 | 0.2 | 5.9 | 0.0 |
| 5.7 | <0.1 | 5.0 | 0.2 | 4.2 | 0.3 | 4.2 | 0.1 | 3.7 | 0.1 | 2.9 | <0.1 | 4.9 | 0.2 | 3.3 | 0.1 | 4.8 | 0.2 | 4.4 | 0.2 | 6.8 | 0.0 |
| 6.65 | <0.1 | 5.6 | 0.2 | 4.9 | 0.3 | 4.8 | <0.1 | 4.3 | 0.1 | 3.0 | <0.1 | 5.4 | 0.3 | 3.6 | 0.1 | 5.6 | 0.2 | 5.1 | 0.2 | 7.7 | 0.0 |
| 7.6 | <0.1 | 6.2 | 0.1 | 5.6 | 0.1 | 5.4 | 0.0 | 4.9 | 0.1 | 3.1 | <0.1 | 5.9 | 0.2 | 3.9 | 0.2 | 6.4 | 0.25 | 5.8 | 0.1 | 8.6 | 0.0 |
| 8.55 | <0.1 | 6.8 | 0.1 | 6.3 | 0.1 | 6.0 | 0.0 | 5.5 | 0.1 | 3.2 | <0.1 | 6.4 | 0.2 | 4.2 | 0.2 | 7.2 | 0.25 | 6.5 | 0.1 | 9.5 | 0.0 |
| 9.5 | <0.1 | 7.4 | 0.1 | 7.0 | 0.1 | 6.6 | <0.1 | 6.1 | 0.1 | 3.3 | <0.1 | 6.9 | 0.1 | 4.5 | 0.1 | 8.0 | 0.3 | 7.2 | <0.1 | 10.4 | 0.0 |
| 9.8 | 0.0 | 7.6 | 0.0 | 7.1 | 0.0 | 6.9 | 0.0 | 8.2 | 0.0 | 6.5 | 0.0 | 7.0 | 0.0 | 5.0 | 0.0 | 8.5 | 0.0 | 7.2 | 0.0 | 10.4 | 0.0 |
| Run | | Run | | Run | | Run | | Riffle | | Riffle | | Run | | Run | | Run | | Run | | Riffle | |
| | | | | | | | | | | | | | | | | | | | | | |

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.

GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Transects in order of up to downstream.

Mark dry depth measurements as 0; measurements less than 0.1m as < 0.1; and greater than 1m as > 1

Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Renee Martin Date: 5/7/07

WBID# 0167
Site# 2

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
(must be completed for each site)

| | |
|--|--|
| Date & Time: 1815 5/7/07 | Site Location Description (e.g., road crossing): |
| Personnel (Data Collectors): R. Martin & J. Hrabik | |
| Current Weather Conditions: clear | Facility Name: Eolia WWTF |
| Weather Conditions for Past 10 days: unknown | Permit Number: MO 0112470 |
| Drought Conditions?: No drought <input type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input checked="" type="checkbox"/> | |

Site Locations:

| LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS) | | | |
|---|-----------------------------|--|--|
| Site GPS Coordinates: UTM X: 4341305 | | Y: 4341305 | |
| HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.) | | | |
| Global Positioning System (GPS) | | Interpolation | |
| Static Mode | | Topographic Map or DRG | |
| Dynamic Mode (Kinematic) | | Aerial Photograph or DOQQ | |
| Precise Positioning Service | | Satellite Imagery | |
| Signal Averaging | | Interpolation Other | Real Time Differential Correction with |
| Real Time Differential Processing | | Post Processing | |
| HORIZONTAL ACCURACY ESTIMATE | | | |
| GPS Data Quality | | Interpolation Data Quality | |
| FOM | ± _____ Meters | Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters | |
| EPE | ± 22 Feet or ± _____ Meters | | |
| PDOP | | | |

Photos:

| Upstream Photos | | Downstream Photos | | Other Photos | |
|---------------------|---------------|------------------------|--|--------------|---------------|
| Photo ID# | Photo Purpose | Photo ID# | Photo Purpose | Photo ID# | Photo Purpose |
| See Attached Photos | | 0167-2-21 0167-2-22 | Upstream Site #2, Transect #1 Downstream Site #2, Transect #1 | | |

Uses Observed*: (Uses actually observed at time of survey.)

| | | | | |
|--|--------------------------------------|---------------------------------------|---|---------------------------------------|
| <input type="checkbox"/> Swimming | <input type="checkbox"/> Skin diving | <input type="checkbox"/> SCUBA diving | <input type="checkbox"/> Tubing | <input type="checkbox"/> Water skiing |
| <input type="checkbox"/> Wind surfing | <input type="checkbox"/> Kayaking | <input type="checkbox"/> Boating | <input type="checkbox"/> Wading | <input type="checkbox"/> Rafting |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Trapping | <input type="checkbox"/> Fishing | <input checked="" type="checkbox"/> None of the above | <input type="checkbox"/> Other: |
| Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.) | | | | |

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

| | | | | |
|--|--------------------------------------|---|--|--|
| <input type="checkbox"/> City/county parks | <input type="checkbox"/> Playgrounds | <input type="checkbox"/> MDC conservation lands | <input type="checkbox"/> Urban areas | <input type="checkbox"/> Campgrounds |
| <input type="checkbox"/> Boating accesses | <input type="checkbox"/> State parks | <input type="checkbox"/> National forests | <input type="checkbox"/> Nature trails | <input type="checkbox"/> Stairs/walkway |
| <input type="checkbox"/> No trespass sign | <input type="checkbox"/> Fence | <input type="checkbox"/> Steep slopes | <input type="checkbox"/> None of the above | <input checked="" type="checkbox"/> Other: |
| Comments: Agriculture Fields/Pastures | | | | |

Indications of Human Use*: (attach photos)

| | | | | | |
|--|--|--|---|---|--|
| <input type="checkbox"/> Roads | <input type="checkbox"/> Rope swings | <input type="checkbox"/> Foot paths/prints | <input type="checkbox"/> Dock/platform | <input type="checkbox"/> Livestock Watering | <input type="checkbox"/> RV / ATV Tracks |
| <input type="checkbox"/> Camping Sites | <input type="checkbox"/> Fire pit/ring | <input type="checkbox"/> NPDES Discharge | <input type="checkbox"/> Fishing Tackle | <input type="checkbox"/> Other: | |
| Comments: None | | | | | |

Stream Morphology:

Upstream View's Physical Dimensions: Is there any water present at this view? ☒ Yes ☐ No

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | 160 | 5.0 | 20 | 0.25 | 0.3 |
| POOL | | | | | |

Downstream View's Physical Dimensions: Is there any water present at this view? ☐ Yes ☐ No

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | | | | | |
| POOL | | | | | |

Substrate*: (These values should add up to 100%.)

| | | | | | |
|-------------|------------|----------|----------|--------------|--------------|
| 25 % Cobble | - % Gravel | - % Sand | - % Silt | - % Mud/Clay | 75 % Bedrock |
|-------------|------------|----------|----------|--------------|--------------|

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

Some algae on substrate

Water Characteristics*: (Mark all that apply.)

| | | | | | |
|------------------|---|---------------------------------|--|--|---------------------------------|
| Odor: | <input type="checkbox"/> Sewage | <input type="checkbox"/> Musky | <input type="checkbox"/> Chemical | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |
| Color: | <input checked="" type="checkbox"/> Clear | <input type="checkbox"/> Green | <input type="checkbox"/> Gray | <input type="checkbox"/> Milky | <input type="checkbox"/> Other: |
| Bottom Deposit: | <input type="checkbox"/> Sludge | <input type="checkbox"/> Solids | <input checked="" type="checkbox"/> Fine sediments | <input type="checkbox"/> None | <input type="checkbox"/> Other: |
| Surface Deposit: | <input type="checkbox"/> Oil | <input type="checkbox"/> Scum | <input type="checkbox"/> Foam | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: Renee Martin Date of Survey: 5/7/07

Organization: AE Solutions Position: Env. Specialist

Recreational Use Attainability Analysis Field Survey Sheet

| | | | |
|--|--|---|--|
| Waterbody ID: <u>0167</u> | | Site #: <u>0167-2</u> | |
| Estimated Channel Incision: <u>0.1</u> (m) (height between low bank width and water) | | | |
| GPS Location: <u>0668307</u> | | UTM Y: <u>4341305</u> | |
| UTM X: <u>0668307</u> | | Horizontal Accuracy Estimate (GPS Data Quality): <u>+/- 22</u> (feet) | |
| PDOP: _____ | | | |
| Average Stream Width: <u>8</u> (meters) | | Length of Survey Segment: <u>160</u> (meters) | |
| | | (20x average stream width) | |
| Field Staff: <u>Renee Martin & Jenny Hrabik</u> | | | |

| Dissolved Oxygen | |
|--------------------|----------------------|
| Dissolved Oxygen: | <u>9.35</u> (mg/L) |
| Dissolved Oxygen: | <u>106.1</u> (% sat) |
| Specific Cond: | <u>300.4</u> (µS/cm) |
| Water Temperature: | <u>23.9</u> (°C) |

| Transect Cross-Section | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|-----|
| 01 | | 02 | | 03 | | 04 | | 05 | | 06 | | 07 | | 08 | | 09 | | 10 | | 11 | | |
| Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | |
| 1 | 1.3 | 0.1 | 7.0 | 0.1 | 3.0 | 0.1 | 0.1 | 0.2 | 0.0 | <0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 1.4 | 0.1 | 1.5 | 0.1 | 0.0 | <0.1 | 0.4 | 0.1 |
| 2 | 2.0 | <0.1 | 7.4 | 0.1 | 3.6 | 0.1 | 1.1 | <0.1 | 0.65 | <0.1 | 0.6 | 0.1 | 0.25 | 0.1 | 1.46 | 0.1 | 2.0 | <0.1 | 0.32 | <0.1 | 0.8 | 0.1 |
| 3 | 2.7 | <0.1 | 7.8 | 0.1 | 4.2 | 0.1 | 2.1 | <0.1 | 1.3 | <0.1 | 1.2 | 0.2 | 0.5 | 0.1 | 1.52 | 0.1 | 2.5 | <0.1 | 0.64 | <0.1 | 1.2 | 0.2 |
| 4 | 3.4 | 0.1 | 8.2 | <0.1 | 4.8 | 0.1 | 3.1 | 0.0 | 1.95 | <0.1 | 1.8 | 0.2 | 0.75 | 0.2 | 1.58 | 0.1 | 3.0 | 0.1 | 0.96 | <0.1 | 1.6 | 0.2 |
| 5 | 4.1 | 0.1 | 8.6 | <0.1 | 5.4 | 0.2 | 4.1 | 0.0 | 2.6 | <0.1 | 2.4 | 0.3 | 1.0 | 0.2 | 1.64 | 0.1 | 3.5 | 0.1 | 1.28 | <0.1 | 2.0 | 0.3 |
| 6 | 4.8 | 0.1 | 9.0 | <0.1 | 6.0 | 0.1 | 5.1 | <0.1 | 3.25 | <0.1 | 3.0 | 0.3 | 1.25 | 0.1 | 1.7 | 0.1 | 4.0 | <0.1 | 1.6 | <0.1 | 2.4 | 0.3 |
| 7 | 5.5 | 0.1 | 9.4 | <0.1 | 6.6 | 0.1 | 6.1 | <0.1 | 3.9 | <0.1 | 3.6 | 0.3 | 1.50 | 0.2 | 1.76 | 0.1 | 4.5 | 0.1 | 1.92 | <0.1 | 2.8 | 0.3 |
| 8 | 6.2 | 0.1 | 9.8 | <0.1 | 7.2 | 0.1 | 7.1 | 0.1 | 4.55 | <0.1 | 4.2 | 0.3 | 1.75 | 0.1 | 1.82 | 0.1 | 5.0 | 0.1 | 2.24 | <0.1 | 3.2 | 0.3 |
| 9 | 6.9 | 0.1 | 10.2 | <0.1 | 7.8 | <0.1 | 8.1 | <0.1 | 5.2 | <0.1 | 4.8 | 0.3 | 2.00 | 0.1 | 1.88 | 0.1 | 5.5 | 0.1 | 2.56 | <0.1 | 3.6 | 0.2 |
| 10 | 7.6 | 0.1 | 10.6 | 0.1 | 8.4 | 0.1 | 9.1 | <0.1 | 5.85 | <0.1 | 5.4 | 0.3 | 2.25 | 0.1 | 1.94 | 0.1 | 6.0 | 0.1 | 2.88 | <0.1 | 4.0 | 0.2 |
| 11 | 8.3 | 0.1 | 11.0 | 0.1 | 9.0 | 0.1 | 10.1 | <0.1 | 6.5 | <0.1 | 6.0 | 0.3 | 2.50 | 0.1 | 2.0 | <0.1 | 6.5 | <0.1 | 3.2 | <0.1 | 4.4 | 0.1 |
| 12 | 8.5 | 0.0 | 11.3 | 0.0 | 9.1 | 0.0 | 10.1 | 0.0 | 6.5 | 0.0 | 6.2 | 0.0 | 2.6 | 0.0 | 2.0 | 0.0 | 6.5 | 0.0 | 3.2 | 0.0 | 4.6 | 0.0 |
| Feature Type | Run | | Run | | Run | | Riffle | | Riffle | | Run | | Run | | Riffle | | Run | | Riffle | | Run | |
| | | | | | | | | | | | | | | | | | | | | | | |

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.

GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Transects in order of up to downstream.

Mark dry depth measurements as 0; measurements less than 0.1m as < 0.1; and greater than 1m as > 1

Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Renee Martin Date: 5/7/07

WBID# 0167
Site# 3

Field Data Sheets for Recreational Use Stream Surveys
Data Sheet B - Site Characterization
(must be completed for each site)

| | |
|--|--|
| Date & Time: 5/7/07 1900 | Site Location Description (e.g., road crossing): |
| Personnel (Data Collectors): R. Martin & J. Hrabik | Near N. Cornerstone Church Rd. |
| Current Weather Conditions: clear | Facility Name: Eolia WWTF |
| Weather Conditions for Past 10 days: unknown | Permit Number: MO 0112470 |
| Drought Conditions?: No drought <input type="checkbox"/> ; Phase I <input type="checkbox"/> ; Phase II <input type="checkbox"/> ; Phase III <input type="checkbox"/> ; Phase IV <input type="checkbox"/> ; Unknown <input checked="" type="checkbox"/> | |

Site Locations:

| LOCATION COORDINATES (UNIVERSAL TRANSVERSE MERCATOR PROJECTION, IN METERS) | | | |
|---|-----------------------------------|--|--|
| Site GPS Coordinates: UTM X: 4341138 | | Y: 4341138 | |
| HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.) | | | |
| Global Positioning System (GPS) | | Interpolation | |
| Static Mode | | Topographic Map or DRG | |
| Dynamic Mode (Kinematic) | | Aerial Photograph or DOQQ | |
| Precise Positioning Service | | Satellite Imagery | |
| Signal Averaging | | Interpolation Other | Real Time Differential Correction with |
| Real Time Differential Processing | | Post Processing | |
| HORIZONTAL ACCURACY ESTIMATE | | | |
| GPS Data Quality | | Interpolation Data Quality | |
| FOM | ± _____ Meters | Source Map Scale: 1:24,000 1:100,000 Other _____ ± _____ Feet or ± _____ Meters | |
| EPE | ± 21 _____ Feet or ± _____ Meters | | |
| PDOP | | | |

Photos:

| Upstream Photos | | Downstream Photos | | Other Photos | |
|---------------------|---------------|------------------------|--|--------------|---------------|
| Photo ID# | Photo Purpose | Photo ID# | Photo Purpose | Photo ID# | Photo Purpose |
| See Attached Photos | | 0167-3-23 0167-3-24 | Upstream Site #3, Transect #1 Downstream Site #3, Transect #1 | | |

Uses Observed*: (Uses actually observed at time of survey.)

| | | | | |
|--|--------------------------------------|---------------------------------------|---|---------------------------------------|
| <input type="checkbox"/> Swimming | <input type="checkbox"/> Skin diving | <input type="checkbox"/> SCUBA diving | <input type="checkbox"/> Tubing | <input type="checkbox"/> Water skiing |
| <input type="checkbox"/> Wind surfing | <input type="checkbox"/> Kayaking | <input type="checkbox"/> Boating | <input type="checkbox"/> Wading | <input type="checkbox"/> Rafting |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Trapping | <input type="checkbox"/> Fishing | <input checked="" type="checkbox"/> None of the above | <input type="checkbox"/> Other: |
| Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use <i>Data Sheet D- Recreational Use Interview</i> when conducting interviews.) | | | | |

Surrounding Conditions*: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

| | | | | |
|---|--------------------------------------|---|---|--|
| <input type="checkbox"/> City/county parks | <input type="checkbox"/> Playgrounds | <input type="checkbox"/> MDC conservation lands | <input type="checkbox"/> Urban areas | <input type="checkbox"/> Campgrounds |
| <input type="checkbox"/> Boating accesses | <input type="checkbox"/> State parks | <input type="checkbox"/> National forests | <input type="checkbox"/> Nature trails | <input type="checkbox"/> Stairs/walkway |
| <input type="checkbox"/> No trespass sign | <input type="checkbox"/> Fence | <input type="checkbox"/> Steep slopes | <input checked="" type="checkbox"/> None of the above | <input checked="" type="checkbox"/> Other: |
| Comments: Nothing but grassy, pasture like conditions | | | | |

Indications of Human Use*: (attach photos)

| | | | | | |
|---|--|--|---|---|--|
| <input checked="" type="checkbox"/> Roads | <input type="checkbox"/> Rope swings | <input type="checkbox"/> Foot paths/prints | <input type="checkbox"/> Dock/platform | <input type="checkbox"/> Livestock Watering | <input type="checkbox"/> RV / ATV Tracks |
| <input type="checkbox"/> Camping Sites | <input type="checkbox"/> Fire pit/ring | <input type="checkbox"/> NPDES Discharge | <input type="checkbox"/> Fishing Tackle | <input type="checkbox"/> Other: | |
| Comments: None | | | | | |

* Page Two – Data Sheet B for WBID # 0167:

Stream Morphology:

Upstream View's Physical Dimensions: Is there any water present at this view? ☒ Yes ☐ No

If so, is there an obvious current? ☒ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | | | | | |
| POOL | 120 | 6.5 | 20 | 0.35 | 0.4 |

Downstream View's Physical Dimensions: Is there any water present at this view? ☐ Yes ☐ No

If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following **channel features**:

| Channel Feature | Distance from access (m) | Width (m) | Length (m) | Median Depth (m) | Max. Depth (m) |
|-----------------|--------------------------|-----------|------------|------------------|----------------|
| RIFFLE | | | | | |
| RUN | | | | | |
| POOL | | | | | |

Substrate*: (These values should add up to 100%.)

| | | | | | | | | | | | |
|----|----------|---|----------|---|--------|---|--------|---|------------|----|-----------|
| 25 | % Cobble | - | % Gravel | - | % Sand | - | % Silt | - | % Mud/Clay | 75 | % Bedrock |
|----|----------|---|----------|---|--------|---|--------|---|------------|----|-----------|

Aquatic Vegetation*: (Note amount of vegetation or algal growth at the assessment site)

Algae on substrate

Water Characteristics*: (Mark all that apply.)

| | | | | | |
|------------------|---|---------------------------------|--|--|---------------------------------|
| Odor: | <input type="checkbox"/> Sewage | <input type="checkbox"/> Musky | <input type="checkbox"/> Chemical | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |
| Color: | <input checked="" type="checkbox"/> Clear | <input type="checkbox"/> Green | <input type="checkbox"/> Gray | <input type="checkbox"/> Milky | <input type="checkbox"/> Other: |
| Bottom Deposit: | <input type="checkbox"/> Sludge | <input type="checkbox"/> Solids | <input checked="" type="checkbox"/> Fine sediments | <input type="checkbox"/> None | <input type="checkbox"/> Other: |
| Surface Deposit: | <input type="checkbox"/> Oil | <input type="checkbox"/> Scum | <input type="checkbox"/> Foam | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Other: |

Comments: Please attach any additional comments () to this form.

*This information is not to be used solely for removal of a recreational use designation but rather is to provide a more comprehensive understanding of water conditions. Consequently, this information is not intended to directly influence a decision on the recreation use analysis but may point to conditions that need further analysis or that effect another use.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Surveyor's Signature: Renee Martin Date of Survey: 5/7/07

Organization: AE Solutions Position: Env. Specialist

Recreational Use Attainability Analysis Field Survey Sheet

| | | | |
|--|--|---|--|
| Waterbody ID: <u>0167</u> | | Site #: <u>0167.3</u> | |
| Estimated Channel Incision: <u><1.0</u> (m) (height between low bank width and water) | | | |
| GPS Location: <u>0668202</u> | | UTM Y: <u>4341138</u> | |
| UTM X: <u>0668202</u> | | Horizontal Accuracy Estimate (GPS Data Quality): <u>+/- 21</u> (feet) | |
| PDOP: _____ | | | |
| Average Stream Width: <u>5</u> (meters) | | Length of Survey Segment: <u>150</u> (meters) | |
| (20x average stream width) | | | |
| Field Staff: <u>Renee Martin & Jenny Hrabik</u> | | | |

| Dissolved Oxygen | |
|--------------------|---------------------|
| Dissolved Oxygen: | <u>7.43</u> (mg/L) |
| Dissolved Oxygen: | <u>90.2</u> (% sat) |
| Specific Cond: | <u>334</u> (µS/cm) |
| Water Temperature: | <u>24.2</u> (°C) |

| Transect Cross-Section | | | | | | | | | | | | | | | | | | | | | |
|------------------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|
| 01 | | 02 | | 03 | | 04 | | 05 | | 06 | | 07 | | 08 | | 09 | | 10 | | 11 | |
| Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) | Distance (m) | Depth (m) |
| 0.5 | 0.1 | 1.0 | 0.1 | 0.5 | 0.1 | 0.7 | 0.1 | 0.6 | 0.1 | 0.3 | 0.1 | 0.0 | 0.1 | 0.4 | 0.1 | 1.0 | 0.1 | 0.5 | 0.1 | 1.2 | 0.1 |
| 0.9 | 0.1 | 1.25 | 0.1 | 1.0 | 0.1 | 0.95 | 0.1 | 0.7 | 0.2 | 0.6 | 0.3 | 0.6 | 0.4 | 0.9 | 0.2 | 1.5 | 0.2 | 0.75 | 0.2 | 1.5 | 0.1 |
| 1.3 | 0.1 | 1.5 | 0.1 | 1.5 | 0.2 | 1.2 | 0.2 | 0.8 | 0.1 | 0.9 | 0.3 | 1.2 | 0.3 | 1.4 | 0.3 | 2.0 | 0.3 | 1.0 | 0.2 | 1.8 | 0.1 |
| 1.7 | 0.1 | 1.75 | <0.1 | 2.0 | 0.2 | 1.45 | 0.2 | 0.9 | 0.2 | 1.2 | 0.1 | 1.8 | 0.3 | 1.9 | 0.2 | 2.5 | 0.3 | 1.25 | 0.2 | 2.1 | <0.1 |
| 2.1 | 0.1 | 2.0 | 0.1 | 2.5 | 0.3 | 1.7 | 0.2 | 1.0 | 0.2 | 1.5 | 0.1 | 2.4 | 0.2 | 2.4 | 0.4 | 3.0 | 0.3 | 1.50 | 0.2 | 2.4 | <0.1 |
| 2.5 | 0.1 | 2.25 | 0.1 | 3.0 | 0.3 | 1.95 | 0.2 | 1.1 | 0.2 | 1.8 | 0.1 | 3.0 | 0.2 | 2.9 | 0.4 | 3.5 | 0.3 | 1.75 | 0.2 | 2.7 | <0.1 |
| 2.9 | 0.1 | 2.5 | 0.1 | 3.5 | 0.3 | 2.2 | 0.2 | 1.2 | 0.1 | 2.1 | 0.2 | 3.6 | 0.2 | 3.4 | 0.4 | 4.0 | 0.3 | 2.0 | 0.2 | 3.0 | <0.1 |
| 3.3 | 0.1 | 2.75 | 0.1 | 4.0 | 0.2 | 2.45 | 0.1 | 1.3 | 0.1 | 2.4 | 0.1 | 4.2 | 0.2 | 3.9 | 0.3 | 4.5 | 0.3 | 2.25 | 0.2 | 3.3 | 0.1 |
| 3.7 | 0.1 | 3.0 | 0.1 | 4.5 | 0.2 | 2.7 | 0.1 | 1.4 | 0.1 | 2.7 | 0.1 | 4.8 | 0.1 | 4.4 | 0.3 | 5.0 | 0.3 | 2.50 | 0.2 | 3.6 | 0.1 |
| 4.1 | 0.1 | 3.25 | <0.1 | 5.0 | 0.1 | 2.95 | 0.1 | 1.5 | 0.1 | 3.0 | <0.1 | 5.4 | <0.1 | 4.9 | 0.2 | 5.5 | 0.2 | 2.75 | 0.1 | 3.9 | 0.1 |
| 4.5 | 0.1 | 3.50 | <0.1 | 5.5 | 0.1 | 3.2 | 0.1 | 1.6 | 0.1 | 3.3 | <0.1 | 6.0 | 0.1 | 5.4 | 0.1 | 6.0 | 0.1 | 3.0 | 0.1 | 4.2 | 0.1 |
| 4.9 | 0.0 | 3.6 | 0.0 | 6.4 | 0.0 | 3.5 | 0.0 | 2.8 | 0.0 | 4.0 | 0.0 | 6.2 | 0.0 | 6.4 | 0.0 | 7.0 | 0.0 | 4.0 | 0.0 | 4.5 | 0.0 |
| Run | | Run | | Run | | Run | | Riffle | | Run | | Run | | Pool | | Run | | Run | | Riffle | |
| | | | | | | | | | | | | | | | | | | | | | |

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.

GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Transects in order of up to downstream.

Mark dry depth measurements as 0; measurements less than 0.1m as < 0.1; and greater than 1m as > 1

Measurement 1 depth = 0.1m (unless depth is insufficient); Measurement 11 depth = 0.1m (unless depth is insufficient); Measurement 12 distance = entire wetted width distance and depth = 0m.

Signed: Renee Martin Date: 5/7/07



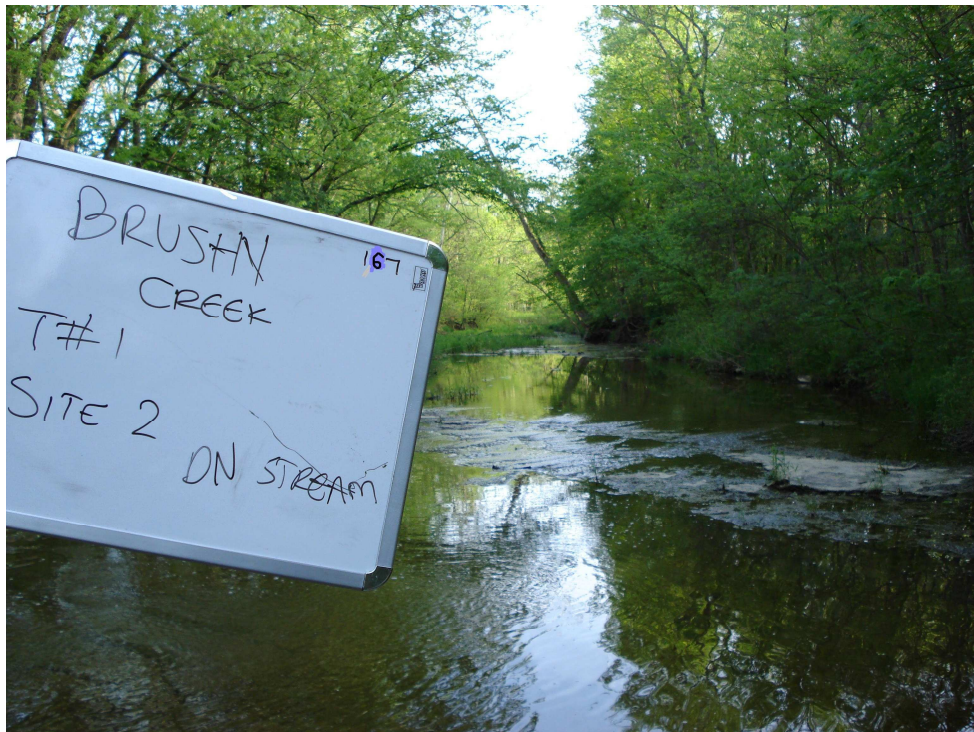
1. Upstream Site 1, Transect 1



2. Downstream Site 1, Transect 1



3. Upstream Site 2, Transect 1



4. Downstream Site 2, Transect 1



5. Upstream Site 3, Transect 1



6. Downstream Site 3, Transect 1



"Renee Martin "
<rmartin@aesolutionsmo.com>
m>

03/19/2008 04:43 PM

To anne.peery@dnr.mo.gov

cc

bcc

Subject UAA Comments

Anne,

Let me know if you need anything else.

Regards, Renee

Renee Martin

AE Solutions

1123 Wilkes Blvd., Ste 300

Columbia, MO 65201

Office: 573-875-7844

Fax: 573-875-7845

rmartin@aesolutionsmo.com

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DNR_Comments_0167.doc DNR_Comments_0950.doc

WBID# 0167

Brushy Creek

Surveyor: Renee Martin

Organization: AE Solutions

Stream sites 1-3 were accessed in the upper portion of the creek because the landowner would not allow us access beyond North Cornerstone Church Road.